

J. M. FEDDERS.

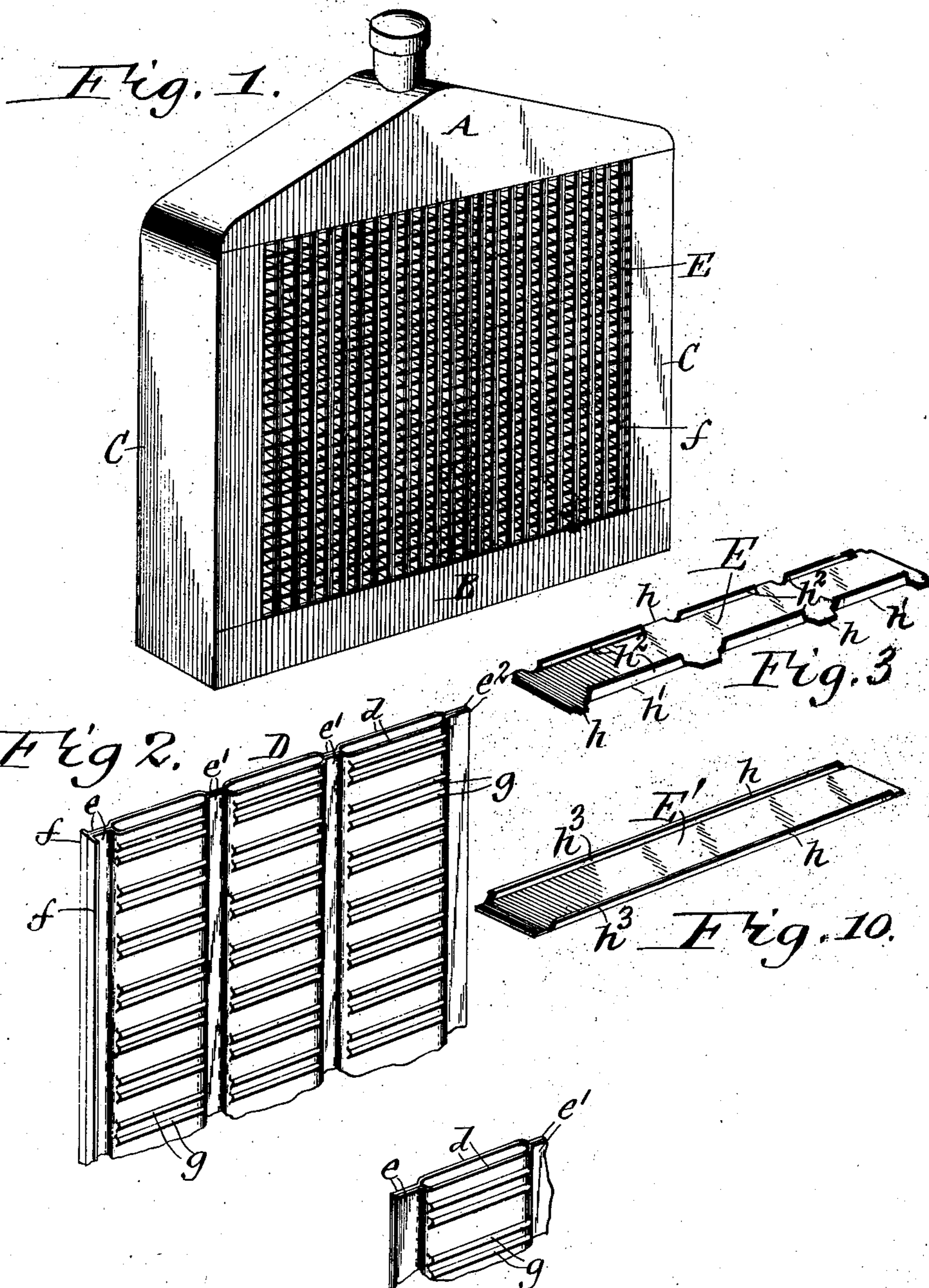
RADIATOR.

APPLICATION FILED MAY 19, 1910.

992,763.

Patented May 23, 1911.

2 SHEETS-SHEET 1.



Witnesses:-
Richard Soumerai
Alfred Borkenhagen

Fig. 4.

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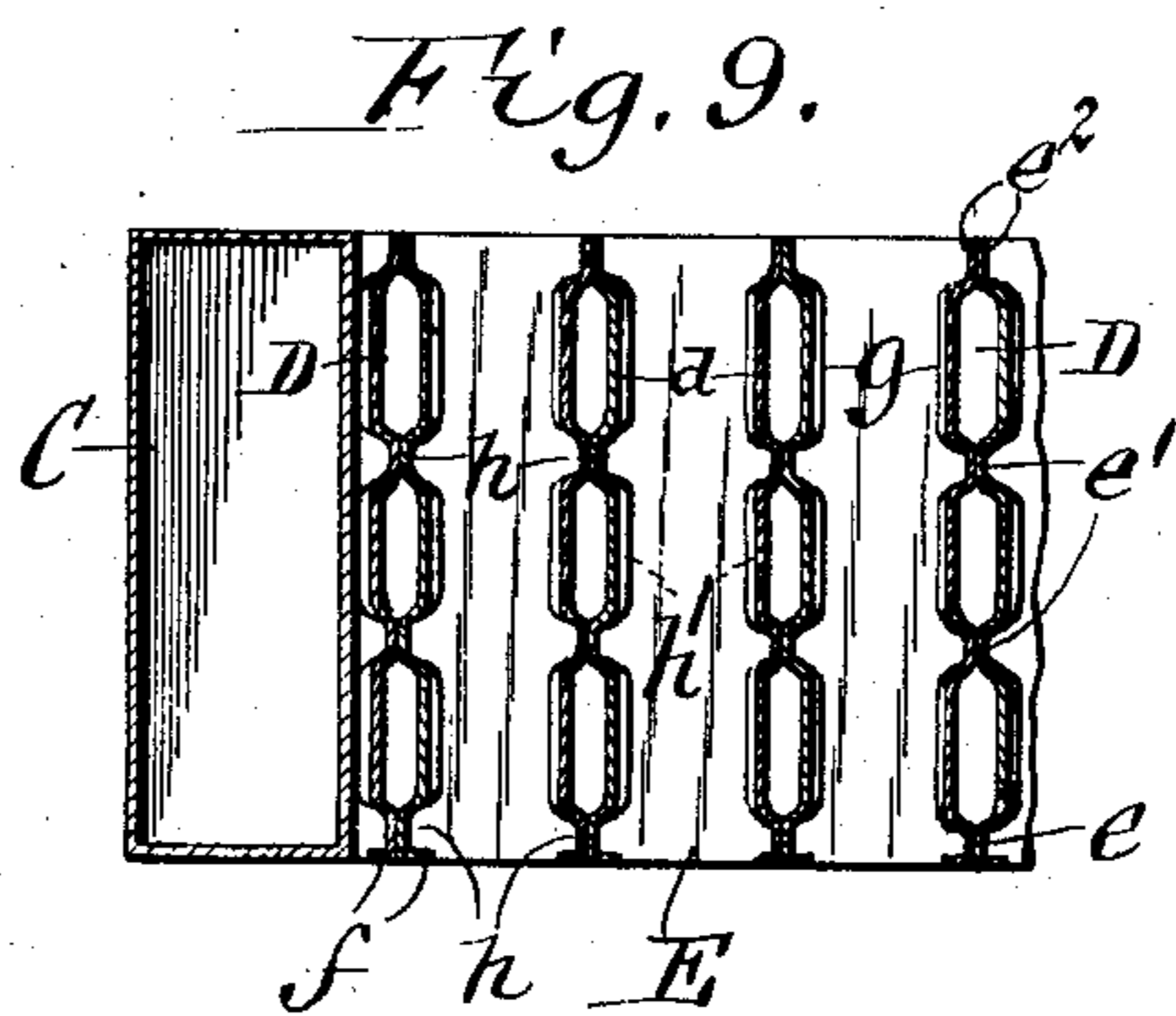
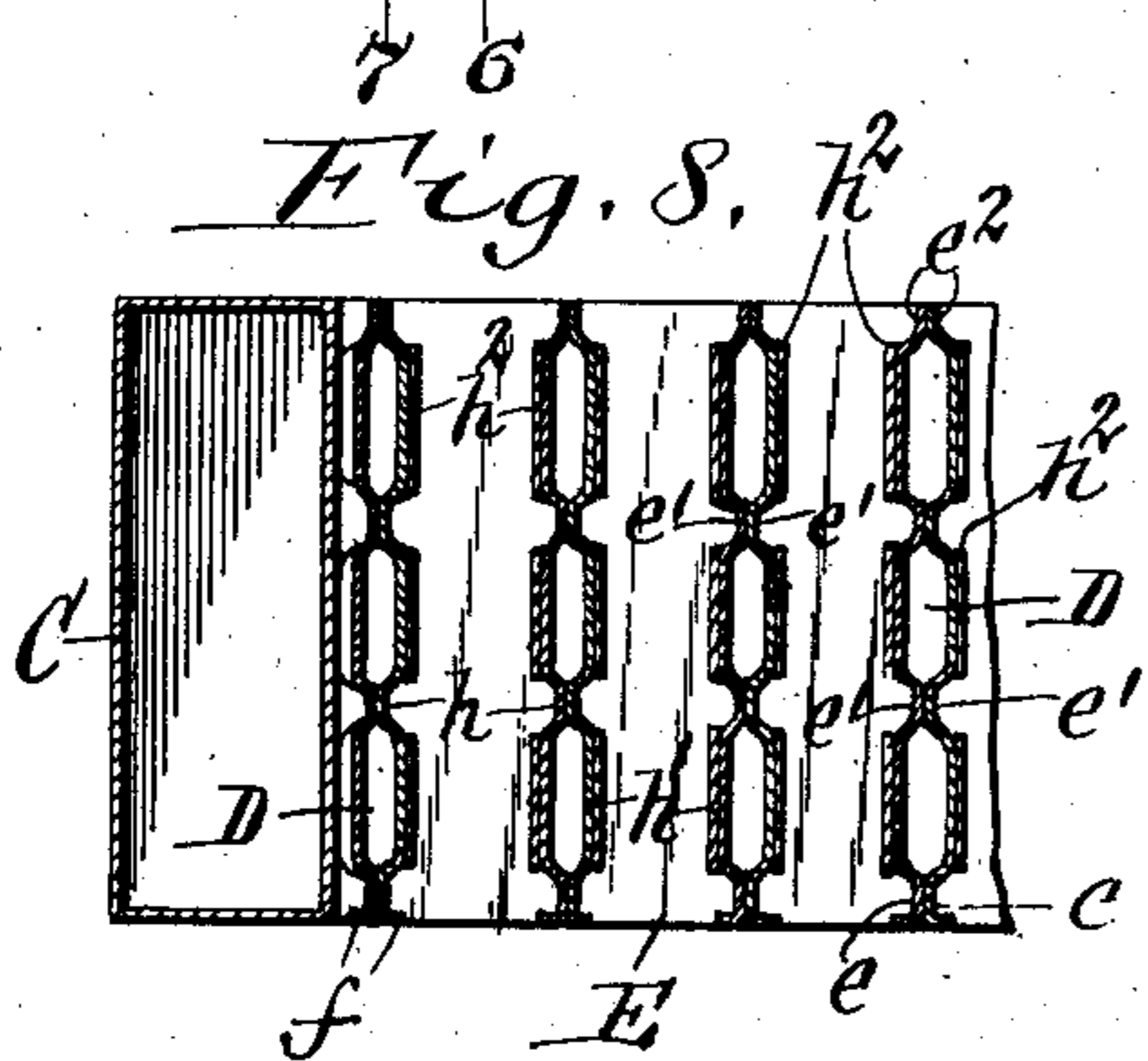
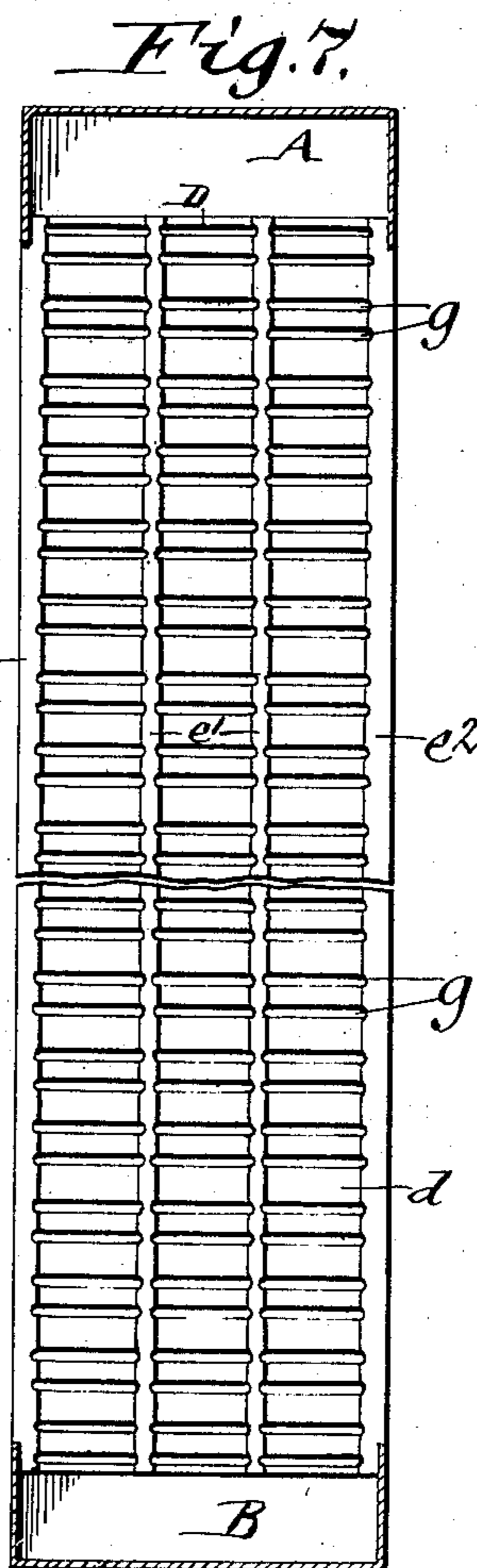
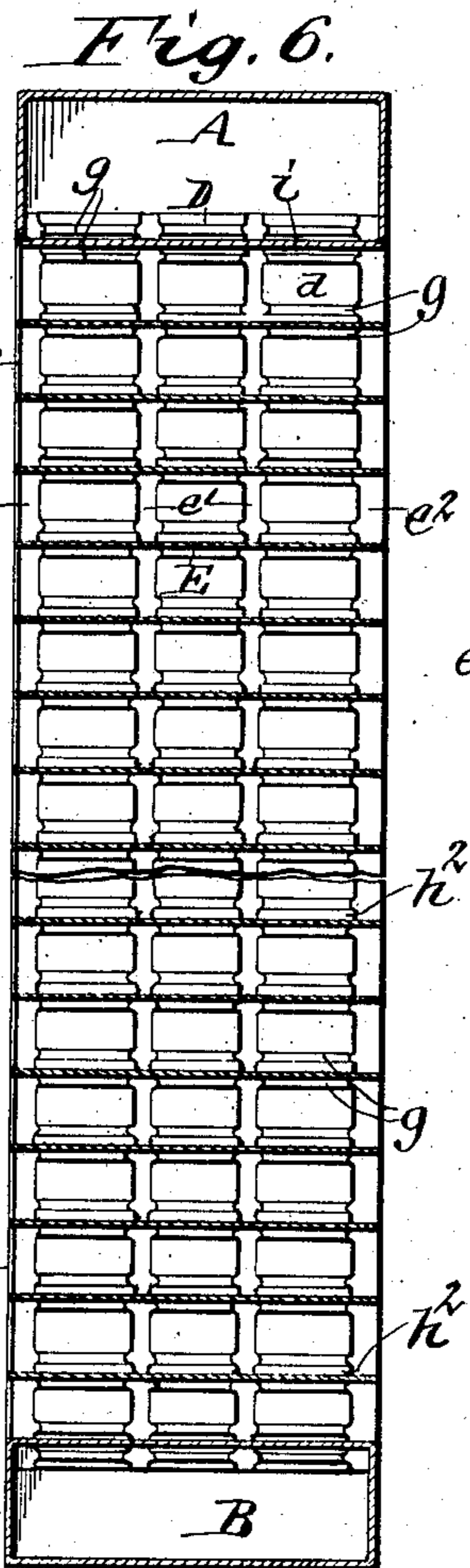
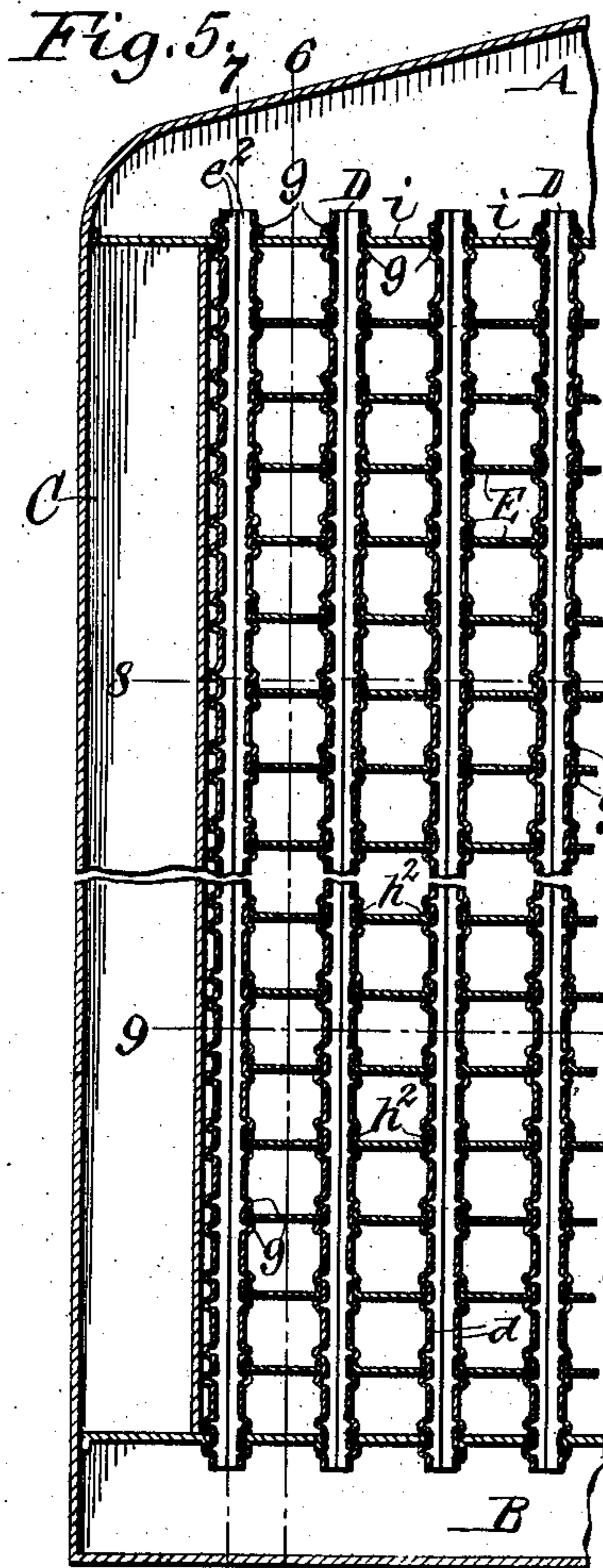
RADIATOR.

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2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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RADIATOR.

992,763.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed May 19, 1910. Serial No. 562,225.

To all whom it may concern:

Be it known that I, JOHN M. FEDDERS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Radiators, of which the following is a specification.

This invention relates to an automobile radiator and has for its object the production of a radiator of this character which in appearance resembles the square tube radiator now in common use but which is more efficient in operation, can be produced at less cost and is capable of being repaired more easily.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a perspective view of my improved radiator. Fig. 2 is a fragmentary sectional perspective view of one of the water tubes of my improved radiator. Fig. 3 is a similar view of one of the radiating webs, strips or fins. Fig. 4 is a view similar to Fig. 2 showing a slight modification of my invention. Fig. 5 is a fragmentary vertical transverse section of my improved radiator, on an enlarged scale. Figs. 6 and 7 are vertical sections in the correspondingly numbered lines in Fig. 5. Figs. 8 and 9 are horizontal sections in the correspondingly numbered lines in Fig. 5. Fig. 10 is a perspective view showing a modified form of the radiating webs or strips.

Similar letters of reference indicate corresponding parts throughout the several views.

In its general organization, my improved radiator comprises an upper inlet header or manifold A, a lower outlet header or manifold B, two side pieces C connecting the opposite ends of the manifolds, a plurality of upright water tubes D arranged in a transverse row between the side pieces and each connected at its upper and lower ends with the upper and lower manifolds, respectively, and a plurality of horizontal webs, strips or fins E arranged in vertical tiers in the spaces between the tubes.

Each of the water tubes is oblong in cross section or elongated horizontally from the front to the rear side of the radiator, so that the water passes through the same in the form of a thin film, thereby causing the heat in the same to be radiated more rapidly. Each water tube is preferably constructed of two upright sheet metal plates

or walls d , d which are provided on their opposing inner sides at their vertical edges, and at intervals between the edges, with ribs or beads e , e^1 , e^2 . The front and rear ribs e , e^2 are secured to each other by soldering so as to complete the tube and seal the same, while the intermediate beads e^1 only bear against each other and keep the central parts of the tube walls from collapsing or being pressed an undue extent toward each other, thereby preserving the shape of the tube. The vertical front edges of the tube walls may be provided with laterally projecting upright flanges f , f , as shown, for the purpose of stiffening these edges of the walls and also for giving the same a heavier appearance, as shown in Fig. 2. If desired, however, the front edges of the tube walls may be left unflanged, as shown in Fig. 4.

The radiating webs, strips or fins between adjacent water tubes are spaced apart vertically a distance equal to the distance between adjacent water tubes, thereby dividing this space into a plurality of horizontal air passages which extend fore and aft and each of which is square in cross section. Each of these webs may be secured to the adjacent outer sides of the tube walls in various ways but preferably by providing these walls between their beads with a plurality of pairs of horizontal longitudinal ribs or beads g which project outwardly. A seat for the adjacent longitudinal edge of one of the webs is formed between each pair of beads g .

The front and rear ends of the webs are preferably flush with the front and rear edges of the tubes for producing a finished appearance. Each web is provided on each of its longitudinal edges with alternate salient and receding portions or faces h , h^1 , as shown in Fig. 3. The salient portion h of the webs fit into the outer sides of the inwardly bent beads e , e^1 , e^2 of the tubes and the receding portions h^1 fit into the grooves which are formed on the outer sides of the tubes between the beads thereof. The webs and tubes are preferably secured to each other by soldering.

For the purpose of stiffening the webs and also increasing the soldering area each longitudinal edge of a web is provided with a vertical flange. As shown in Figs. 3, 5, 6, 8 and 9, this flange is constructed in sec-

tions h^2 one of which is arranged adjacent to each receding edge portion of the web and secured in the seat of the tube between the adjacent beads g .

5 If desired the web E^1 may be provided with straight longitudinal edges and continuous attaching and stiffening flanges n^3 , as shown in Fig. 10.

10 By providing ribs or beads on the tubes for the reception of the longitudinal edges of the webs, the parts can be assembled more easily and the structure as a whole is rendered much stronger.

15 The upper ends of the water tubes project upwardly through openings in the bottom or tube sheet of the upper header or manifold and the lower ends of these tubes project downwardly through openings in the top or tube sheet of the lower header or manifold, so that these tubes establish communication between these headers. Although the flue sheet of the upper and lower headers may be constructed in various ways, each of these sheets is preferably built up 20 of a plurality of sections i each of which is constructed substantially like one of the radiating webs E and also secured to the tubes in like manner by soldering each longitudinal edge of a tube sheet section in a seat formed at the end of a tube between a pair of outwardly projecting beads g arranged on the outer side of a wall of the tube.

Owing to the fact that no water comes in 35 contact with the radiating webs, the same may be made of tin or other cheap metal, thereby confining the use of copper, brass or other more expensive non-corroding metal to the water tubes and effecting a corresponding saving in the cost of manufacture.

40 I claim as my invention:

1. A radiator comprising an inlet header, an outlet header, a plurality of water tubes connecting the headers and provided on 45 their outer sides with a plurality of pairs of outwardly projecting beads forming a seat between each pair of beads, and a plurality of radiating webs arranged in the spaces between the tubes and each engaging at its opposite edges in seats on the opposing walls 50 of adjacent tubes.

2. A radiator comprising an inlet header,

an outlet header, a plurality of water tubes connecting the headers and provided on their outer sides with a plurality of pairs of 55 outwardly projecting beads forming a seat between each pair of beads, and a plurality of radiating webs arranged in the spaces between the tubes and each provided at its opposite longitudinal edges with flanges which 60 are secured in the seats of said tubes.

3. A radiator comprising an inlet header, an outlet header, a plurality of water tubes connecting the headers and each provided on its front edge with longitudinal flanges 65 projecting laterally in opposite directions, and radiating webs arranged in the spaces between the tubes and each provided with flanges on its longitudinal edges which stop short of the front end of the web and are 70 secured to the outer sides of the adjacent tubes while the front end of the web is unflanged at its longitudinal edges and fits between the corresponding flanges at the front edges of the adjacent water tubes so as to 75 be flush therewith.

4. A radiator comprising an inlet header, an outlet header, tubes connecting said headers and provided with inwardly indented beads, and radiating webs arranged 80 between the tubes and each provided on its opposite longitudinal edges with salient and receding portions which fit the outer sides of the beads on the tubes and the parts of the tubes between said beads, respectively. 85

5. A radiator comprising an inlet header, an outlet header, tubes connecting said headers and provided with inwardly indented beads and radiating webs arranged 90 between the tubes and each provided on its opposite longitudinal edges with salient and receding portions which fit the outer sides of the beads on the tubes and the parts of the tubes between said beads, respectively, 95 and said webs being provided on their receding edge portions with flange sections which are secured to the adjacent outer parts of the tubes.

Witness my hand this 17th day of May, 1910.

JOHN M. FEDDERS.

Witnesses:

THEO. L. POPP,
ANNA HEIGIS.